

DISCLAIMER

This electronic version of an SCC order is for informational purposes only and is not an official document of the Commission. An official copy may be obtained from the [Clerk of the Commission, Document Control Center](#).

APPLICATION OF

KINDER MORGAN VIRGINIA LLC

CASE NO. PUE-2001-00423

For approval of a certificate of public convenience and necessity pursuant to Va. Code § 56-265.2, an exemption from Chapter 10 of Title 56, and interim approval to make financial commitments and undertake preliminary construction work

REPORT ON REMAND OF HOWARD P. ANDERSON, JR., HEARING EXAMINER

August 13, 2002

HISTORY OF THE CASE

On July 26, 2001, Kinder Morgan Virginia LLC (“Kinder Morgan Virginia” or the “Company”) filed an Application with supporting testimony and exhibits requesting that the State Corporation Commission (“Commission”) grant the Company a certificate of public convenience and necessity (“CPCN”) pursuant to § 56-265.2 of the Code of Virginia to construct an approximately 560 megawatt (“MW”) natural gas-fired combined-cycle power plant (“Brunswick Generating Station” or the “facility”) in Brunswick County, Virginia. In addition, the Company sought an exemption from the provisions of Chapter 10 of Title 56, pursuant to § 56-265.2 B of the Code of Virginia, and interim approval to make financial expenditures and undertake preliminary construction work, pursuant to § 56-234.3 of the Code of Virginia.

On August 14, 2001 the Commission entered an order requiring the Company to provide public notice of its Application, established a procedural schedule for the filing of testimony and exhibits, assigned a Hearing Examiner to conduct further proceedings in this matter and scheduled an evidentiary hearing for November 7, 2001.

On November 7, 2001, the evidentiary hearing was convened as scheduled. Donald G. Owens, Esquire, and John W. Daniel, II, Esquire, appeared on behalf of Kinder Morgan Virginia. Katharine Austin Hart, Esquire, and C. Meade Browder, Esquire, appeared on behalf of the Commission’s Divisions of Energy Regulation and Economics and Finance. James S. Copenhaver, Esquire, appeared on behalf of Columbia Gas of Virginia, Inc.

Five public witnesses spoke in favor of the facility. Kinder Morgan Virginia presented the testimony of two witnesses: Mr. Joseph D. Hopper, vice president and general manager of Kinder Morgan Power, and Mr. Carmine Iadarola, president of AquaSan Network, Inc. and project manager for the Kinder Morgan Virginia proposed facility. Mr. Hopper described the facility, its location, and its operating characteristics. Mr. Iadarola presented testimony regarding the environmental impact of the facility.

The Commission Staff presented the testimony of five witnesses: Eswara B. Raju, senior utilities engineer in the Commission's Division of Energy Regulation; Lawrence T. Oliver, assistant director of the Commission's Division of Economics and Finance; Joseph P. Hassell, environmental program manager, Department of Environmental Quality ("DEQ"), Office of Water Permits; and Jaime Bauer, environmental engineer, DEQ.

On February 26, 2002, I filed my Report summarizing the record and reviewing and analyzing the evidence and issues in this proceeding. In my Report I concluded that the proposed facility would not materially affect rates paid by customers of any public utility and that the facility would have a positive effect on the local economy. I further found that, with a 250-million gallon reservoir, water withdrawals from the Meherrin River would have no significant impact on the environment. I also found that, because the facility would use only natural gas as a fuel, the impact on air quality would not be significant. In conclusion, I recommended approval of the proposed facility.

On April 29, 2002, the Commission issued an Order remanding the case for further proceedings with respect to consideration of the environment. Citing the opinion in *Application of Tenaska Virginia Partners, L.P.*¹ ("Tenaska"), a majority of the Commission found Virginia law requires the Commission to consider the cumulative impact of other facilities and the proposed facility on the existing air quality. Specifically, a majority of the Commission stated:

For example, the record does not address the existing air quality with respect to various criteria pollutants, or the cumulative impact on existing air quality for criteria pollutants from the Facility and other proposed facilities that will add to such pollutants. As we found in *Tenaska*, we must first know where on the continuum of air quality the area impacted by the Facility falls for each criteria pollutant. General terms such as "attainment" are not sufficient; we need to know, for example, how close current air quality is to "nonattainment." We also need to know what impact the Facility and other facilities, including proposed electric generating units and other major facilities, may have on the area.²

On June 19, 2002, the Company filed remand testimony of Carmine Iadarola addressing the issues raised by the Commission in its Order. By Hearing Examiner's Ruling of July 1, 2002, Mr. Iadarola's remand testimony was accepted into the record.³

¹*Application of Tenaska Virginia Partners, L.P., For approval of a certificate of public convenience and necessity pursuant to Virginia Code § 56-265.2, an exemption from Chapter 10 of Title 56, and interim approval to make financial commitments and undertake preliminary construction work*, Case No. PUE-2001-00039, Order (January 16, 2002).

²Order at 3.

³The Application was uncontested and Staff had no questions regarding the remand testimony of Mr. Iadarola. Mr. Iadarola's remand testimony was marked as Exhibit 12 and made a part of the record of this proceeding.

DISCUSSION

Existing Air Quality

In the *Tenaska* case, Trinity Consultants developed a methodology for determining existing levels of air quality in the general area of a proposed generating facility and the projected additional impacts from other proposed generating facilities in Virginia. The methodologies for performing the study were established with the concurrence of representatives from the Commission and DEQ. The investigation of cumulative air quality impacts focuses on “criteria pollutants,” substances for which the U. S. Environmental Protection Agency (“EPA”) has established National Ambient Air Quality Standards (“NAAQSs”). The six criteria pollutants are:

- Nitrogen Dioxide (“NO₂”)⁴
- Particulate Matter (“PM₁₀”)⁵
- Sulfur Oxides (such as “SO₂”)
- Carbon Monoxide (“CO”)
- Ozone (“O₃”)⁶
- Lead (“Pb”)⁷

NAAQSs are applicable throughout the country. States must adopt and enforce ambient air quality standards that are no less stringent than the NAAQSs.

In the 1977 Amendments to the Clean Air Act, Congress established a program for the Prevention of Significant Deterioration (“PSD”) of air quality. Because many areas of the country had existing levels of air quality that were lower or better than the NAAQSs, Congress prescribed maximum allowable increases (“PSD Increments”) of particulate matter and sulfur dioxide concentrations in these “clean areas.” The PSD program regulates cumulative air quality impacts of three criteria air pollutants by establishing a ceiling on allowable increases in PM₁₀, SO₂, and NO_x.

With EPA oversight, states administer ambient air monitoring programs to determine compliance with the NAAQSs and the PSD Increments in any given area. To this end, DEQ operates ambient air monitoring stations at sites throughout the Commonwealth. This air

⁴Power plants emit Oxides of Nitrogen (“NO_x”) consisting primarily of Nitric Oxide (“NO”) and smaller amounts of NO₂. NO emissions convert quickly in the atmosphere to NO₂.

⁵The subscript “10” with the identifier for particulate matter indicates that the ambient standard applies only to small particles suspended in the air, specifically particles with an aerodynamic diameter of less than or equal to 10 microns. A “micron” is a micrometer or one meter divided by one million. By comparison, a human hair is roughly 70 microns in diameter.

⁶Ozone is not emitted from power plants but instead is a product of complex photochemical reactions in the atmosphere primarily involving NO₂ and Volatile Organic Compounds (“VOCs”). VOCs consist of a multitude of hydrocarbon-based chemicals which exist as gases under normal temperatures and pressures, and which have the ability to react in the atmosphere to form ozone.

⁷A power plant’s emission of lead is directly related to the concentration of that element in the fuel.

monitoring network measures actual concentrations of each criteria pollutant at the following number of monitoring stations:

- NO₂ - 13 monitoring stations
- PM₁₀ - 19 monitoring stations
- SO₂ - 11 monitoring stations
- CO - 12 monitoring stations
- O₃ - 24 monitoring stations.

Although DEQ operates an extensive network of monitoring stations throughout the state, it has no monitoring stations located in Brunswick County. Therefore, monitoring stations reasonably expected to collect data representative of the ambient air quality in Brunswick County were chosen. Because projected emissions from the proposed facility triggered PSD review for three criteria pollutants (NO_x, PM₁₀ and CO), DEQ provided background values for these pollutants at the proposed facility location.

Using DEQ's approach of selecting representative data and based on the Trinity Analysis used in the *Tenaska* case, the Company determined the SO₂ levels in Brunswick County by using measurements from the Charles City monitoring station. The Charles City station was used because it is approximately 60 miles from the proposed Kinder Morgan Virginia site and, like Brunswick County, is primarily rural.

Determining the level of ozone in Brunswick County presented a different problem. Unlike other criteria pollutants released directly from emission sources, ozone is formed in the atmosphere through complex reactions among ozone precursors, primarily VOCs and NO₂.⁸ The proposed Brunswick County site does not have a high degree of stationary or mobile sources of emissions of ozone precursors, nor is the site downwind of any primary sources of VOCs or NO₂. Therefore, ozone in Brunswick County results from what is known as "regional transport," i.e., ozone which has formed from emissions at great distances and carried by prevailing winds.⁹ Based on calculations and meteorological data, DEQ's ozone monitor in Wythe County was selected as most likely to measure levels of ozone best representing the level of ozone in Brunswick County.

⁸See n.6 *supra*.

⁹In addition to ambient air monitoring, the ground level concentration of an air pollutant at a particular location can be determined by means of an air quality dispersion model. Pollutant source locations and meteorological data are but two of the factors used in these calculations. Because air dispersion models are used for air quality management, the EPA imposes strict guidelines. These strict guidelines provide very conservative results. Therefore, the projected concentrations of a pollutant will often be higher than what will actually be the case.

Based on data provided by DEQ, data from the Trinity Analysis in the *Tenaska* case, and other representative data, the Company offers the following summary of the existing air quality status in the Brunswick area of interest.

Existing Air Quality in Area Impacted by Applicant's Facility¹⁰

Criteria Pollutant	Averaging Period	Existing Level, ppb	NAAQS, ppb
NO ₂	Annual	12.2	53
PM ₁₀	Annual	23 µg/m ³	50 µg/m ³
PM ₁₀	24-hour	55 µg/m ³	150 µg/m ³
SO ₂	Annual	6.0	30
SO ₂	24-hour	26.4	140
SO ₂	3-hour	80.1	500
CO	8-hour	3,416	9,000
CO	1-hour	5,434	35,000
O ₃	1-hour	96	120

NAAQSs establish the maximum allowable concentrations of each criteria pollutant in the ambient air. The existing air quality in Brunswick County is very good. As is shown in the table above, only one criteria pollutant, ozone, has existing concentrations in excess of 50% of the applicable NAAQS. This situation, however, is commonplace throughout the eastern United States and is attributable in part to the regional transport of ozone and its precursors. Mr. Iadarola testified that, once NO_x emission reductions begin to take place in 2004 throughout a large portion of the eastern and midwestern United States, future ambient levels of ozone are expected to be considerably less than predicted in the table above.¹¹

Company witness Iadarola testified that the cumulative impact of all other proposed facilities will be insignificant in Brunswick County. This is because the significant impact of a combined-cycle gas-fired generation facility occurs within an area no greater than 2.5 miles from that plant.¹²

¹⁰Ex. 12, at 14.

¹¹Id.

¹²Ex. 12, at 7, 8. This is, in part, due to the relatively short stack height of the gas-fired facilities.

Air Quality Impact of the Proposed Facility

As part of the process of applying for a PSD permit from DEQ, the Company performed an analysis of the specific impact of the proposed Kinder Morgan Virginia facility on the Brunswick area. Based on the dispersion model contained the Company's PSD permit application, the following criteria pollutant impacts are predicted to result from emissions at the proposed facility:

Impacts of Applicant's Facility¹³

Criteria Pollutant	Averaging Period	Maximum Impact, ppb
NO ₂	Annual	4.5
PM ₁₀	Annual	1.8 µg/m ³
PM ₁₀	24-hour	25.3 µg/m ³
SO ₂	Annual	0.31
SO ₂	24-hour	2.8
SO ₂	3-hour	4.7
CO	8-hour	854
CO	1-hour	1,213

Although the PSD permit application did not require a specific modeling analysis of ozone impacts from the proposed facility, the Company has estimated ozone impacts due to the proposed facility based upon previous ozone modeling performed by DEQ. In January of 2002, DEQ performed a model of the cumulative ozone impacts expected from 16 proposed power plants in Virginia. Based on 5,986 tons per year of NO_x emissions from the 16 plants, DEQ predicted a maximum increase in hourly ambient ozone concentrations of 2.5 parts per billion in central and southeastern Virginia.

Based on the premise that ambient ozone concentrations may be assumed to be directly proportional to the quantity of NO_x emissions, the Company made the following analysis: Annual NO_x emissions from the proposed facility are estimated to be 682.4 tons per year. The Company used the DEQ methodology to predict that the estimated level of ozone attributable to emissions from the proposed facility will be 0.28 parts per billion.¹⁴

With the exception of ozone, the most significant impact of emissions from the plant will occur within a short distance from the proposed facility. As the PSD program was being developed in the late 1970s the process of tracking PSD increment consumption had to take into account the geographical range of the emission. It was soon recognized that the concentration of a dispersing pollutant typically drops off rapidly with increasing distance from the emitting source. Because of this rapid drop off, the EPA recognized that levels of the pollutant beyond a certain range (generally about 31 miles) became insignificant. Based on their dispersion models, the EPA established

¹³Ex. 12, at 18.

¹⁴The formula used by the Company to estimate the contribution of the proposed facility to the ambient ozone levels is (682.4/5,968) x 2.5 ppb = 0.28 ppb.

“significant” impacts of criteria pollutants. The geographical range or “impact area” was defined as:¹⁵

A circular area with a radius extending from the source to the most distant point where approved dispersion modeling predicts a significant ambient impact will occur.

The maximum area of significant impact of criteria pollutants, with the exception of ozone, from the proposed facility ranges from 0.3 mile to 2.5 miles from the center of the proposed facility. In short, emissions from the proposed Kinder Morgan facility will have no significant impact on air quality beyond 2.5 miles from the center of the facility.

The limited radius of significant emission impact is due to a phenomenon referred to as “downwash effect.” When air flows encounter an object such as a building or other structure, the air flow is disturbed or altered and a significant portion of the emission plume is caught in the resulting downwash effect, causing some of those emissions to impact ground level before any significant dispersion can take place. This downwash effect can result in substantial elevated concentrations of pollutants in the immediate area of the building. Good engineering practices necessitate that a stack be at least 2.5 times higher than any nearby building or structure. Stack heights at the Company’s facility do not satisfy the good engineering practices, thus downwash will occur.

Cumulative Impacts

Cumulative impact analyses from other applications indicate that, in the case of each criteria pollutant, the maximum combined impact from all proposed electric generating facilities in Virginia is insignificant. This means that the cumulative air quality impacts for each criteria pollutant from the proposed power plants do not rise above the respective levels determined by the EPA to constitute a significant impact. In general, the power plants proposed for Virginia have relatively low emission rates and relatively low stack heights which limit the area of emission impact. In general, the locations for the proposed facilities are widely dispersed, which reduces the likelihood that any significant impact from one plant will overlap with a significant impact from another plant. Finally, as revealed in the Trinity Analysis, the combined impacts of all of the proposed power plants do not rise to any aggregate or cumulative impact of significance. The following table taken

¹⁵U. S. Environmental Protection Agency, *New Source Review Workshop Manual* (Draft), c. 26 (Oct. 1990). Ex. 12, at 21.

from the Trinity Analysis depicts the maximum cumulative impact from all proposed power plants excluding the Kinder Morgan facility.

**Maximum Cumulative Impacts from All Other Proposed Facilities
(Excluding Applicant's Facility)¹⁶**

Criteria Pollutant	Averaging Period	Maximum Impact, ppb
NO ₂	Annual	0.37
PM ₁₀	Annual	0.28 µg/m ³
PM ₁₀	24-hour	2.39 µg/m ³
SO ₂	Annual	0.03
SO ₂	24-hour	1.03
SO ₂	3-hour	3.835
CO	8-hour	60.0
CO	1-hour	123
O ₃	1-hour	3.72

The above data will undoubtedly overestimate cumulative impacts because it is unlikely that all 23 of the proposed facilities will be permitted, constructed, and operated. Furthermore, the extent of the future cumulative air quality impacts is not as dependent on the number of plants actually constructed and operating as it is on the distance of separation between any two facilities. With average stack heights of 100 to 200 feet, the cumulative air quality impacts will be much more sensitive to the distance of separation between the plants. As long as the new facility sites are more than ten miles apart, the cumulative impacts will be unaffected by the proposed number of new facilities.

In regard to the cumulative air quality impact for the Brunswick County area, the following table depicts the cumulative impacts of all proposed facilities including the Kinder Morgan Virginia facility¹⁷:

Cumulative Impacts of All Other Proposed Facilities together with Applicant's Facility¹⁸

Criteria Pollutant	Averaging Period	Impact of All Other Facilities (ppb)	Impact of KVM Facility (ppb)	Cumulative Impact (ppb)	PSD Increment (ppb)
NO ₂	Annual	0.37	4.5	4.9	13.3
PM ₁₀	Annual	0.28 µg/m ³	1.8 µg/m ³	2.1 µg/m ³	17 µg/m ³
PM ₁₀	24-hour	2.39 µg/m ³	25.3 µg/m ³	27.7 µg/m ³	30 µg/m ³
SO ₂	Annual	0.03	0.31	0.34	7.5
SO ₂	24-hour	1.03	2.8	3.8	34.9
SO ₂	3-hour	3.83	4.7	8.5	197
CO	8-hour	60.0	854	914	--
CO	1-hour	123	1,213	1,336	--
O ₃	1-hour	3.72	0.28	4.0	--

¹⁶Ex. 12, at 29.

¹⁷The impact of the Kinder Morgan Virginia facility is greater because it will be located in Brunswick County.

¹⁸Ex. 12, at 33.

As shown by the data above, the combined air quality impacts of all proposed power plants will not exceed any PSD increment in the area to be impacted by the proposed Kinder Morgan Virginia facility. The following table shows that, even if all proposed power plants are constructed and operated at their maximum permitted emission rates, ambient air quality levels in the Brunswick area will continue to remain well below the NAAQSs for all criteria pollutants.

Future Air Quality in Area Impacted by Applicant's Facility¹⁹

<u>Criteria Pollutant</u>	<u>Averaging Period</u>	<u>Future Level (ppb)</u>	<u>NAAQS (ppb)</u>
NO ₂	Annual	17.1	53
PM ₁₀	Annual	25.1 µg/m ³	50 µg/m ³
PM ₁₀	24-hour	82.7 µg/m ³	150 µg/m ³
SO ₂	Annual	6.3	30
SO ₂	24-hour	30.2	140
SO ₂	3-hour	88.6	500
CO	8-hour	4,330	9,000
CO	1-hour	6,770	35,000
O ₃	1-hour	100	120

Summary

As noted above, the existing concentration of each criteria pollutant, with the exception of ozone, in the area that will be impacted by the proposed Kinder Morgan Virginia facility is estimated to be substantially below the NAAQSs. With the exception of ozone, none of the concentrations of criteria pollutants is above 50 percent of the applicable standards. The majority of the existing levels of criteria pollutants are less than 30 percent of the applicable NAAQSs.²⁰

The current level of ozone in the Brunswick County area is estimated to be about 80% of the NAAQSs. Elevated levels of ozone are common throughout the Northeast, Mid-Atlantic, Southeast and the Midwest. This widespread phenomenon is attributable to reactions of ozone precursors in the upper atmosphere and transport of the resulting ozone over large distances. Beginning in May of 2004, the EPA has required all states with NO_x emissions significantly contributing to these ozone levels to implement major reductions in these emissions. This should reduce the current ozone levels in Brunswick County. As illustrated in the ozone bar graph in Appendix A to this Report, the contribution of the proposed Kinder Morgan Virginia facility to the ozone level will be minimal.

A better perspective on air quality can be gained by comparing gas-fired combined-cycle plants with older coal-fired plants. Dispersion from gas-fired plants differs from that of older coal-fired plants because their respective emission characteristics are different. Beginning in 1960 and

¹⁹*Id.* This table combines the existing air quality in Brunswick Co. with the cumulative impact of all the proposed power plants including Kinder Morgan Virginia.

²⁰Bar graphs depicting the existing levels of criteria pollutants, the contribution of the proposed facility to these levels, and the relative impact on the NAAQSs are found in Appendix A to this Report.

continuing through much of the 1970s, numerous electric utilities adopted air pollution control strategies that spread the pollution over as wide an area as possible, based on the premise that the “solution to pollution is dilution.” Stack heights of 700 to 1,000 feet were not uncommon for coal-fired plants. In addition to tall stacks, many of the coal-fired plants from that era had little air pollution control other than equipment for reducing emissions of particulate matter. The table below compares the emission rates of NO_x, SO₂, and PM₁₀ from Dominion Power’s Chesterfield power plant with the proposed Kinder Morgan Virginia facility in Brunswick County.

Annual Emissions, tons per year²¹
Older Coal-fired Power Plants and New Gas-fired Combined-Cycles

	<u>NO_x, tpy</u>	<u>SO₂, tpy</u>	<u>PM₁₀, tpy</u>
Va. Power - Chesterfield	18,145	65,953	775
KMV - Brunswick	682	14	180

Kinder Morgan Virginia is primarily intermediate with some base load and peaking capability. The Chesterfield power plant is a base load facility. Because of stack heights, the older coal-fired plants can have a significant environmental impact extending for many miles from the plant. The comparatively low emitting gas-fired combined-cycle plants are fundamentally different in that their dispersion patterns are highly localized. Therefore, the overwhelming weight of the evidence in this case is that the air quality impact, cumulative and from the proposed facility, will be minimal.

Kinder Morgan Virginia received its PSD permit from DEQ on April 30, 2002.²²

FINDINGS AND RECOMMENDATIONS

Based on the evidence in this case, **I FIND** that:

- (1) The current level of air quality in Brunswick County is in attainment of all NAAQSs;
- (2) The Company’s analyses used in this case are reasonable and tend to overstate the actual air quality impact of the proposed facility and the actual cumulative air quality impact of the proposed facilities in Virginia; and
- (3) The Company’s cumulative impacts analysis adequately demonstrates that the proposed facility will have an insignificant impact on air quality in Brunswick County and surrounding counties.

²¹Ex. 12, at 27.

²²The PSD Permit is attached as Appendix B to this Report.

I therefore **RECOMMEND** the Commission enter an order that:

1. **ADOPTS** the findings contained in this Report;
2. **GRANTS** Kinder Morgan Virginia approval, subject to obtaining all required permits, to construct and operate the proposed facility; and
3. **DISMISSES** this case from the docket of active causes.

COMMENTS

The parties are advised that any comments (Section 12.1-31 of the Code of Virginia and 5 VAC 5-20-120 C) to this Report must be filed with the Clerk of the Commission in writing, in an original and fifteen (15) copies, within twenty-one (21) days from the date hereof. The mailing address to which any such filing must be sent is Document Control Center, P.O. Box 2118, Richmond, Virginia 23218. Any party filing such comments shall attach a certificate to the foot of such document certifying that copies have been mailed or delivered to all counsel of record and any such party not represented by counsel.

Respectfully submitted,

Howard P. Anderson, Jr.
Hearing Examiner